

U.S. ATLAS M&O Estimate WBS Dictionary

4/2/2002 4:04:58 PM

3.4

**WBS
Number**

Description

3.4

Tile Calorimeter System

US participation in the Scintillating Tile Hadronic Calorimeter (Tilecal) subsystem of the ATLAS detector. US responsibilities include mechanical, optical, and electronic systems of one extended barrel calorimeter (approximately 1/4 of the total Tile Calorimeter); purchase, testing, and assembly of 1/3 of the photomultipliers for the Tile Calorimeter, and 1/2 of the front end and digitizing electronics; and full responsibility for the special submodules and scintillation counters comprising the Intermediate Tile Calorimeter, instrumenting the gaps between sections of the Tile Calorimeter and between barrel and endcap cryostats.

WBS Number	Description
3.4.1	<p>TileCal - Specific Costs</p> <p>System-specific costs represent M&O costs associated with the Tile Calorimeter System and supported by the US ATLAS collaborators. Including maintenance cost related to power supplies, system maintenance, and any overall special detector maintenance and telecommunication cost resulting from US participation in the support of the Tile Calorimeter.</p>
3.4.1.1	<p>Pre-Operations</p> <p>Includes all engineering, technical support, and materials purchased to ensure the system is ready for operations. Work includes final integration and testing of all mechanical, electronic and auxiliary systems associated with the subsystem. Testing includes: physical set-up of test areas (benches, tables, test stations), and test beam operations. Includes the final documentation of all fabrication and assembly drawings, assembly and maintenance and safety documents and manuals.</p>
3.4.1.1.1	Mechanical Support
3.4.1.1.2	<p>Electrical Support</p> <p>Electrical aspects of pre-operations and commissioning. This task includes work on PMTs and on front-end and other electronics</p>
3.4.1.1.3	<p>Software Support</p> <p>Comments: Estimated at 2 FTE over two fiscal years, split evenly between ANL and U. Chicago. Final estimate may be apportioned differently.</p>
3.4.1.1.4	Physicist Support
3.4.1.2	<p>Operations (Beam-on)</p> <p>Includes all engineering, technical support, and materials purchased to maintain all systems to their design specifications. Includes resources to perform regular schedule maintenance. Includes all material purchases to maintain an adequate inventory of spare parts for replacement based upon their estimated or normal life cycle standards (electronic boards, cards, etc.)</p> <p>Comments: Operations estimated to be 9.5 months per year</p>
3.4.1.2.1	Mechanical Support

3.4.1

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Description

Includes all engineering, technical support, and materials purchased to maintain all systems to their design specifications. Includes resources to perform regular schedule maintenance. Includes all material purchases to maintain an adequate inventory of spare hardware for incidental consumables.

Comments: .25 ME FTE for 06, then .1 ME FTE thereafter. Also, .5 MT FTE, with .25 MT FTE thereafter. \$10k low value for miscellaneous consumables.

Estimate currently assigned to ANL, but actual distribution to be determined later.

3.4.1.2.2

Electrical Support

Includes all engineering, technical support, and materials purchased to maintain all systems to their design specifications. Includes resources to perform regular schedule maintenance. Includes all material purchases to maintain an adequate inventory of spare parts.

Comments: .25 EE FTE for 06, then .1 EE FTE thereafter. Also, 1.0 ET FTE for operations. \$10k low value for miscellaneous consumables.

Estimate currently assigned to U. Chicago, but actual distribution to be determined later.

3.4.1.2.3

Software Support

Comments: 1 FTE per year, with Half FTE for 06. Currently assigned 50/50 ANL/U. Chicago for estimating purposes, with actual distribution among collaborating institutions later

3.4.1.2.4

Physicist Support

3.4.1.3

Maintenance (Beam-off)

Includes all engineering, technical staff and materials to work on the detector systems during planned shut down periods. Includes schedule maintenance to systems that are not accessible during run periods. Includes anticipated minor repair or replacement activities. Includes all tooling, fixtures or test equipment not included as part of operations scope.

Comments: Maintenance time estimated to be 2.5 months per year. Additional work estimated for FY06 due to anticipated startup issues.

3.4.1.3.1

Mechanical Support

**WBS
Number****Description**

Comments: .25 ME FTE for 06, then .1 ME FTE thereafter. Also, .5 MT FTE, with .25 MT FTE thereafter. \$10k low value for miscellaneous consumables.

Estimate currently assigned to ANL, but actual distribution to be determined later.

3.4.1.3.2**Electrical Support**

Comments: .25 EE FTE for 06, then .1 EE FTE thereafter. Also, .5 ET FTE for operations. \$50k high value for miscellaneous consumables and spares.

Estimate currently applied to U. Chicago, but may be apportioned to other institutions later.

3.4.1.3.3**Software Support**

Comments: .25 FTE flat. \$10k low value for miscellaneous consumables and/or services.

Currently assigned to ANL. However, estimate may be apportioned to other institutions later.

3.4.1.3.4**Physicist Support**

Comments: .25 FTE per year for coordination, planning, and oversight. \$3k low value for miscellaneous consumables.

Currently assigned to ANL. However, this estimate may be apportioned to other institutions later.

WBS Number	Description
3.4.2	<p data-bbox="541 318 852 342">Calibration & Monitoring</p> <p data-bbox="541 370 1843 427">Includes all scientific and technical staff to perform the calibration of the phototubes and electronics, maintain the database of these constants, and monitor the voltages and temperatures of the device</p>
3.4.2.1	<p data-bbox="541 451 737 475">Pre-Operations</p> <p data-bbox="541 505 1843 561">Includes all scientific and technical staff to perform the calibration of the phototubes and electronics, maintain the database of these constants, and monitor the voltages and temperatures of the device.</p> <p data-bbox="541 586 1843 646">Comments: Monitoring and Calibration function will be required during half of 2005 as commissioning begins and continuing to beginning of operations in 7/06. Level of effort is estimated to be half that of operations</p>
3.4.2.1.1	<p data-bbox="541 667 596 691">ANL</p> <p data-bbox="541 721 1843 776">Includes all scientific and technical staff to perform the calibration of the phototubes and electronics, maintain the database of these constants, and monitor the voltages and temperatures of the device.</p>
3.4.2.1.2	<p data-bbox="541 800 674 824">U.Chicago</p> <p data-bbox="541 854 1843 911">Includes all scientific and technical staff to perform the calibration of the phototubes and electronics, maintain the database of these constants, and monitor the voltages and temperatures of the device.</p> <p data-bbox="541 935 1293 963">Comments: Half FTE for a post doc, half time during commissioning</p>
3.4.2.1.3	<p data-bbox="541 987 667 1011">U. Illinois</p> <p data-bbox="541 1040 1843 1097">Includes all scientific and technical staff to perform the calibration of the phototubes and electronics, maintain the database of these constants, and monitor the voltages and temperatures of the device.</p> <p data-bbox="541 1122 1293 1149">Comments: Half FTE for a post doc, half time during commissioning</p>
3.4.2.1.4	<p data-bbox="541 1174 604 1198">MSU</p> <p data-bbox="541 1227 1843 1284">Includes all scientific and technical staff to perform the calibration of the phototubes and electronics, maintain the database of these constants, and monitor the voltages and temperatures of the device.</p> <p data-bbox="541 1308 1293 1336">Comments: Half FTE for a post doc, half time during commissioning</p>
3.4.2.1.5	<p data-bbox="541 1360 596 1385">UTA</p>

3.4.2

WBS Number	Description
3.4.2.2	Operations (Beam-on) Includes all scientific and technical staff to perform the calibration of the phototubes and electronics, maintain the database of these constants, and monitor the voltages and temperatures of the device.
3.4.2.2.1	ANL Includes all scientific and technical staff to perform the calibration of the phototubes and electronics, maintain the database of these constants, and monitor the voltages and temperatures of the device. Comments: 80% of annual staffing level of one FTE post doc
3.4.2.2.2	U.Chicago Includes all scientific and technical staff to perform the calibration of the phototubes and electronics, maintain the database of these constants, and monitor the voltages and temperatures of the device. Comments: 80% of annual staffing level of half FTE post doc
3.4.2.2.3	U. Illinois Includes all scientific and technical staff to perform the calibration of the phototubes and electronics, maintain the database of these constants, and monitor the voltages and temperatures of the device. Comments: 80% of annual staffing level of half FTE post doc
3.4.2.2.4	MSU Includes all scientific and technical staff to perform the calibration of the phototubes and electronics, maintain the database of these constants, and monitor the voltages and temperatures of the device. Comments: 80% of annual staffing level of half FTE post doc
3.4.2.2.5	UTA
3.4.2.3	Maintenance (Beam-off) Includes all scientific and technical staff to perform the calibration of the phototubes and electronics, maintain the database of these constants, and monitor the voltages and temperatures of the device. Includes troubleshooting and checkout for restart.

3.4.2

WBS Number	Description
3.4.2.3.1	<p>Comments: Maintenance is estimated to be 2.5 months per year. Staffing will be level for the year, so maintenance is 20%</p> <p>ANL</p> <p>Includes all scientific and technical staff to perform the calibration of the phototubes and electronics, maintain the database of these constants, and monitor the voltages and temperatures of the device. Includes troubleshooting and checkout for restart.</p> <p>Comments: 20% of annual staffing level of one FTE post doc</p>
3.4.2.3.2	<p>U.Chicago</p> <p>Includes all scientific and technical staff to perform the calibration of the phototubes and electronics, maintain the database of these constants, and monitor the voltages and temperatures of the device. Includes troubleshooting and checkout for restart.</p> <p>Comments: 20% of annual staffing level of half FTE post doc</p>
3.4.2.3.3	<p>U. Illinois</p> <p>Includes all scientific and technical staff to perform the calibration of the phototubes and electronics, maintain the database of these constants, and monitor the voltages and temperatures of the device. Includes troubleshooting and checkout for restart.</p> <p>Comments: 20% of annual staffing level of half FTE post doc</p>
3.4.2.3.4	<p>MSU</p> <p>Includes all scientific and technical staff to perform the calibration of the phototubes and electronics, maintain the database of these constants, and monitor the voltages and temperatures of the device. Includes troubleshooting and checkout for restart.</p> <p>Comments: 20% of annual staffing level of half FTE post doc</p>
3.4.2.3.5	<p>UTA</p>

3.4.3

WBS Number	Description
3.4.3	<p data-bbox="541 321 926 345">Tilecal System Common Costs</p> <p data-bbox="541 375 1927 459">Common cost represent M&O costs associated with the Tile Calorimeter System and shared between the participating collaborators. Including maintenance cost related to special gases,power supplies. Includes UPS maintenance, Coolant consumption, electronic maintenance and any overall special detector maintenance and telecommunication cost.</p> <p data-bbox="541 483 1900 540">Comments: Costs derived from ATLAS M&O.xls and sharing percentage published in ATLAS ARN 5-00, September 18, 2000 Draft 8.1. Current split is 50/50</p>
3.4.3.1	<p data-bbox="541 565 730 589">Pre-operations</p> <p data-bbox="541 618 1927 703">Common cost associated with the Extended Barrel System and shared between the participating collaborators. Costs are divided between ANL and U.Chicago for DOE/NSF split. Actual split and participation of other institutions will be determined later. The sum is the significant number.</p> <p data-bbox="541 727 1900 784">Comments: Costs derived from ATLAS M&O.xls and sharing percentage published in ATLAS ARN 5-00, September 18, 2000 Draft 8.1. Current split is 50/50, exchange rate is 1Chf=\$0.61</p>
3.4.3.1.1	<p data-bbox="541 813 594 837">ANL</p> <p data-bbox="541 867 1927 951">Common cost associated with the Extended Barrel System and shared between the participating collaborators. Costs are divided between ANL and U.Chicago for DOE/NSF split. Actual split and participation of other institutions will be determined later. The sum is the significant number.</p> <p data-bbox="541 976 1900 1032">Comments: Costs derived from ATLAS M&O.xls and sharing percentage published in ATLAS ARN 5-00, September 18, 2000 Draft 8.1. Current split is 50/50</p>
3.4.3.1.2	<p data-bbox="541 1057 674 1081">U.Chicago</p> <p data-bbox="541 1110 1927 1195">Common cost associated with the Extended Barrel System and shared between the participating collaborators. Costs are divided between ANL and U.Chicago for DOE/NSF split. Actual split and participation of other institutions will be determined later. The sum is the significant number.</p> <p data-bbox="541 1219 1900 1276">Comments: Costs derived from ATLAS M&O.xls and sharing percentage published in ATLAS ARN 5-00, September 18, 2000 Draft 8.1. Current split is 50/50</p>
3.4.3.1.3	
3.4.3.2	Operations

3.4.3

WBS Number

Description

Common cost associated with the Extended Barrel System and shared between the participating collaborators. Costs are divided between ANL and U.Chicago for DOE/NSF split. Actual split and participation of other institutions will be determined later. The sum is the significant number.

Comments: Costs derived from ATLAS M&O.xls and sharing percentage published in ATLAS ARN 5-00, September 18, 2000 Draft 8.1. Current split is 50/51

3.4.3.2.1

ANL

Common cost associated with the Extended Barrel System and shared between the participating collaborators. Costs are divided between ANL and U.Chicago for DOE/NSF split. Actual split and participation of other institutions will be determined later. The sum is the significant number.

Comments: Costs derived from ATLAS M&O.xls and sharing percentage published in ATLAS ARN 5-00, September 18, 2000 Draft 8.1. Current split is 50/52

3.4.3.2.2

U.Chicago

Common cost associated with the Extended Barrel System and shared between the participating collaborators. Costs are divided between ANL and U.Chicago for DOE/NSF split. Actual split and participation of other institutions will be determined later. The sum is the significant number.

Comments: Costs derived from ATLAS M&O.xls and sharing percentage published in ATLAS ARN 5-00, September 18, 2000 Draft 8.1. Current split is 50/53

3.4.3.3

Maintenance

Common cost associated with the Extended Barrel System and shared between the participating collaborators. Costs are divided between ANL and U.Chicago for DOE/NSF split. Actual split and participation of other institutions will be determined later. The sum is the significant number.

Comments: Costs derived from ATLAS M&O.xls and sharing percentage published in ATLAS ARN 5-00, September 18, 2000 Draft 8.1. Current split is 50/54

3.4.3.3.1

ANL

Common cost associated with the Extended Barrel System and shared between the participating collaborators. Costs are divided between ANL and U.Chicago for DOE/NSF split. Actual split and participation of other institutions will be determined later. The sum is the significant number.

3.4.3

WBS Number

Description

Comments: Costs derived from ATLAS M&O.xls and sharing percentage published in ATLAS ARN 5-00, September 18, 2000 Draft 8.1. Current split is 50/55

3.4.3.3.2

U.Chicago

Common cost associated with the Extended Barrel System and shared between the participating collaborators. Costs are divided between ANL and U.Chicago for DOE/NSF split. Actual split and participation of other institutions will be determined later. The sum is the significant number.

Comments: Costs derived from ATLAS M&O.xls and sharing percentage published in ATLAS ARN 5-00, September 18, 2000 Draft 8.1. Current split is 50/56